

## AN ANOMALY OF THE DUODENUM RESULTING IN DEATH AFTER GASTRO-ENTEROSTOMY.

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SURGEONS have come to think that the causes of death following gastro-enterostomy are (1) a failure of union at the site of anastomosis, with consequent peritonitis; (2) vicious circle vomiting; (3) shock, and (4) pneumonia. I am recording this case because it presents a fifth cause, a preventable cause; an abnormally short duodenum rendering inadequate and dangerous the operation of posterior gastro-enterostomy with the short loop in those cases associated with an immobilized but greatly distended stomach. So far as I know, no similar case has been reported, and the condition is somewhat rare; but it is important and interesting.

The patient's history is commonplace enough. He was a young man of twenty-nine, a motorman, who had suffered severely with gastric symptoms for five years. It was obvious that he had a greatly dilated stomach, the lower border being two inches below the umbilicus, while there was no apparent ptosis, the upper border not being visibly out of the normal position. An immovable mass, about the size of a pigeon's egg, could be felt in what was thought to be the pyloric region. It was assumed that this mass was inflammatory, and a drainage operation was advised.

Accordingly, on July 8, I opened the abdomen, and found the anticipated conditions. Fig. 1 shows them fairly well. A large part of the pyloric portion was greatly thickened, and was held up to the liver by strong and dense adhesions. No enlarged mesenteric glands were found. So the pyloric portion, owing to its great and extensive thickening, entered but little into the dilatation, which was composed of the thinned and ballooned fundus.

On turning up the omentum, colon, and stomach, and search-



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Fig. 1.



FIG. 2.

ing for the jejunum, I found that that portion of the gut did not spring from a ligament of Treitz upon the left crus of the dia-phragm, but from the right crus. In other words, the fixed duodenum ended upon the right of the spinal column. I thought little of this at the time, and merely mentioned it as an interesting anomaly to my little audience. I had intended to do Finney's pyloroplasty, but, as the conditions were unsuitable, I proceeded with the familiar short-loop posterior gastro-enterostomy. The opening in the stomach was made as near the pylorus as I dared to place it, in view of the thickened and friable condition of the gastrie wall at that portion. The opening in the jejunum was made about three inches from the ligament of Treitz, the fixed portion of the intestine. In other words, the play allowed to the movable stomach and jejunum was to be limited by the short radius—ligament of Treitz to anastomotie opening—afforded by the three-inch limb of jejunum; and in this patient's case the centre from which the radius sprung was upon the right of the spinal column. The anastomosis was made by stitching, without other mechanical device, and, at the end, the technique seemed to be satisfactory.

The patient bore the operation extremely well, and assured me, the next morning, that he had not felt so comfortable for years. Promptly his appetite returned, his bowels acted well, and the quality of his diet was changed from day to day as his keenness for food increased. All went satisfactorily until the fifth day. That morning he complained of some slight epigastric uneasiness, and was immediately put upon a liquid diet with bicarbonate of soda. Nothing more was heard from him until midnight, when he underwent a sudden and violent paroxysm of severe abdominal pain, assoeiated with profound and alarming collapse. Morphia did not quiet him, and the house-surgeon was obliged to use ether. Thus the patient continued until ten o'clock the next morning (ten hours), when he died.

This catastrophe was not clearly explicable until the autopsy, when an interesting and significant situation was revealed. The abdominal cavity was found flooded with gastrie contents. On exploring carefully the stomach, which appeared contracted nearly to the normal size, a large rent was found far to the left, in the fundus of the stomach. At first it was thought that this must be

the perforation of an ulcer, undetected at the operation. It did not seem probable that the anastomotic stoma could be so far from the pylorus; but on farther investigation this rent was found to be the stoma with a portion of the torn-off jejunum attached to its right-hand border. The short arm of this portion of jejunum ran to the ligament of Treitz. It was on the stretch and measured four inches from the stoma to the ligament. Fig. 2 illustrates this appearance.

A little reflection served to explain the rather surprising new arrangement of the parts, and to show what had been going on inside the unfortunate man's abdomen. So long as the stomach remained dilated, the new stoma and the efferent and afferent loops lay in easy relation, and performed their functions. With drainage and rest, however, the overdistended stomach fundus retracted towards a normal position and size. As it retracted it stretched and gradually dragged the afferent loop towards the left, until that portion of the bowel found itself drawn tightly between its fixed point, the ligament of Treitz, and its retracting point, the gastro-intestinal stoma. It gave way accordingly at its new attachment, with a result fatal to the patient. In such a case as this, it is a lamentable reflection that the more perfect the artificial stomach drainage so much the more rapid is the stomach retraction, and so much the earlier is the fatal result. In another similar ease I should perform posterior gastro-enterostomy and entero-enterostomy with section of the afferent loop between the two anastomotic openings.

Unfortunately for surgeons, anomalies of the third and fourth portions of the duodenum are not so rare as many standard text-books state. Quain and Gray hold that the fourth portion ends on the left of the aorta, but recent studies show that statement to be incorrect frequently.

Several years ago, Professor Thomas Dwight tabulated the results of his observations on the duodena of fifty-four adults (*Journal of Anatomy and Physiology*, vol. xxxi, page 516). His findings are so strikingly at variance with the common teaching, and are so important withal, that I quote the following paragraph:

"The usual statement that the third part (of the duode-

num) crosses the aorta, presumably with no peritoneum intervening, and that the fourth ascends on its left, is incorrect. Jonnesco admits that this last part is much less firmly attached than the second and third, so that it slides easily. He states that when the fourth part ascends vertically it lies on the lower third or quarter of the left kidney. . . . In point of fact, it is only exceptionally that the fourth part is prærenal at all. In the fifty-four cases already mentioned, the duodenum was on the right of the aorta, till just before the terminal flexure, twenty-six times. It was wholly on the right six times. The fourth part lay in front of the aorta eleven times, and the third part actually crossed the aorta eleven times."

In other words, from a study of Professor Dwight's paper, it appears that that rather indefinite structure, the ligament of Treitz, may lie in front of the spinal column or even slightly to its right in from 10 to 12 per cent. of adult cases, a fact noteworthy to surgeons, especially in view of the case I have reported here.